PRELIMINARY
INSTRUCTION MANUAL

MODEL 2283
CONTROL UNIT

FOR SERIAL # 122

Quan-Tech LABORATORIES, INC.

INSTRUMENTS • AMPLIFIERS • NOISE INSTRUMENTATION

PROPERTY of SIGNETICS
CALIBRATION LABORATORY

PRELIMINARY
INSTRUCTION MANUAL

MODEL 2283
CONTROL UNIT

FOR SERIAL # 122

QUAN-TECH LABORATORIES, INC.

43 SOUTH JEFFERSON ROAD WHIPPANY, NEW JERSEY 07981

201-887-5508

CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be tested as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. Include model number and serial number when referring to this instrument for any reason.

WARRANTY

Quan-Tech Laboratories, Inc. warrants each instrument manufactured by them to be free from defects in material and workmanship. Our liability under this warranty is limited to servicing or adjusting any instrument returned to the factory for that purpose and to replace any defective parts thereof. Electronic tubes and batteries are specifically excluded from any liability. This warranty is effective for one year after delivery to the original purchaser when the instrument is returned, transportation charges prepaid by the original purchaser, and when upon our examination it is disclosed to our satisfaction to be defective. If the fault has been caused by misadjustments, misuse, or abnormal conditions of operation, repairs will be billed at cost. In this case, an estimate will be submitted before the work is started.

Calibration checks of this instrument can easily be made in accordance with the instruction manual. Routine readjustments should never be attempted. If, however, the instrument has been damaged and requires recalibration or alignment, explicit calibration procedures as defined in the instruction manual must be followed.

If any fault develops, the following steps should be taken:

1. Notify us, giving full details of the difficulty, and include the model number and serial number. On receipt of this information, we will give you service data or shipping instructions.

2. On receipt of shipping instructions, forward the instrument prepaid, to the factory. If requested, an estimate of the charges will be made before the work begins provided the instrument is not covered by the warranty.

SHIPPING

The instruments should be packed in their original containers, or in a strong exterior container and surrounded by two inches of shock absorbing material.

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MODEL 2283

The procedure given below should enable an operator to energize the equipment and through the use of an appropriate filter unit and test board, make a noise test on an integrated circuit.

1. Plug the line cord of the FILTER UNIT into the line receptacle provided at the rear of the CONTROL UNIT.
2. Connect the noise output of the CONTROL UNIT to the noise input of the FILTER UNIT, using the Type 1113 cable provided.
3. Plug the line cord of the CONTROL UNIT into a suitable supply of 117 V, 60 Hz line power and turn the power switch to ON.
4. Set the CONTROL UNIT front panel controls as follows:
   a. Insert the appropriate test board into the test fixture (copper side down). Move the test board and guide assembly to the slanting position and engage the thumb screws. Close the shield cover without an IC in the test socket.
   b. TEST-CAL switch in the CAL position.
   c. TEST-FREQUENCY switch in the 10 Hz position.
   d. IC CIRCUIT GAIN-DB in the approximate position of the gain of the test board.
   e. NEG. VOLTS range switch to the appropriate range and adjust the small concentric knob for the correct voltage.
   f. POS. VOLTS range switch to the appropriate range and adjust the small concentric knob for the correct voltage.

   NOTE: The front panel voltage meters read the actual voltage on the test board; since these voltages are automatically reduced to less than 1 volt by the

interlock switch, the shield cover must be closed to set up proper voltages.

5. Set FILTER UNIT attenuators and multipliers to the fully clockwise positions.
6. Insert the integrated circuit to be tested and close the shield cover.

   WARNING: Never insert an IC into the test socket when the interlock button is depressed, as damage to the device may result.
7. Adjust the small concentric knob on the IC CIRCUIT GAIN switch for center scale indication on the CALIBRATE meter.
8. Switch the TEST CAL switch to the TEST position.
9. Set the NOISE VOLTAGE F.S. switch of the SCALE MULTIPLIERS on the FILTER UNIT for on scale meter indications. At all frequencies the noise meters are now indicating a total noise voltage for the IC under test, for the particular source resistance (R_g) on the test board referred to the input.

In general, the plug-in test board is an entire feedback amplifier which is intended to achieve automatic calibration. The manual calibrate check as previously described, may be performed if there is a question; however for most high gain integrated circuits the calibration need not be checked for each individual device.

MODEL 2283

All functions of the Model 2283 can be checked externally without access to the inside of the equipment. To determine if the instrument is operating normally the following procedure may be used.

1. PRELIMINARY SETUP

   a. Plug the ten pin extender card provided into the test card socket located behind the hinged shield cover. Note that the extender card must stay in the horizontal position as physical interference prevents engaging the retaining thumb screws.

   b. Set both the POS VOLTS and NEG VOLTS range switches to the 30 position and both of the concentric control knobs to the full counter clockwise position.

   c. Plug the line cord of the Model 2283 into 117V, 60 Hz line power and turn the power switch to ON. The EGG emblem should be lighted and the three panel meters should remain in the downscale (to the left) position.

2. POSITIVE 30 VOLT VARIABLE POWER SUPPLY

   a. Connect an external voltmeter between pin 3 of the extender card (pin 1 is on the right when viewed from the front of the equipment), and chassis ground.

   b. Depress the shield cover interlock and adjust the concentric control knob for the positive supply to check meter accuracy, minimum voltage and maximum voltage. The voltage range should be from a few tenths of one volt minimum to at least 30 volts maximum, and meter accuracy should be ± 5% of full scale on both meter ranges.

3. NEGATIVE 30 VOLT VARIABLE POWER SUPPLY

Follow the same procedure as in 2 above for the negative 30 volt supply which is available on pin 6 of the extender card.

4. ± 12 VOLT FIXED POWER SUPPLIES

a. Connect an external voltmeter from pin 8 of the extender card to ground to check the voltage output of the +12V supply. This supply is nominally 12V ± 0.5 V.

b. Connect an external voltmeter from pin 9 of the extender card to ground to check the -12V supply. This supply is also nominally 12V ± 0.5V.

c. Note that the fixed supplies are not switched by the shield cover interlock switch.

5. REMOTE INTERLOCK

a. Apply a short circuit from pin 1 to pin 2 (pin 2 is chassis ground), of the extender card to see that the shield cover interlock function is duplicated (i.e. reduction of the variable power supply voltages for pin 1 - pin 2 open, application of these voltages for pin 1 - pin 2 shorted).

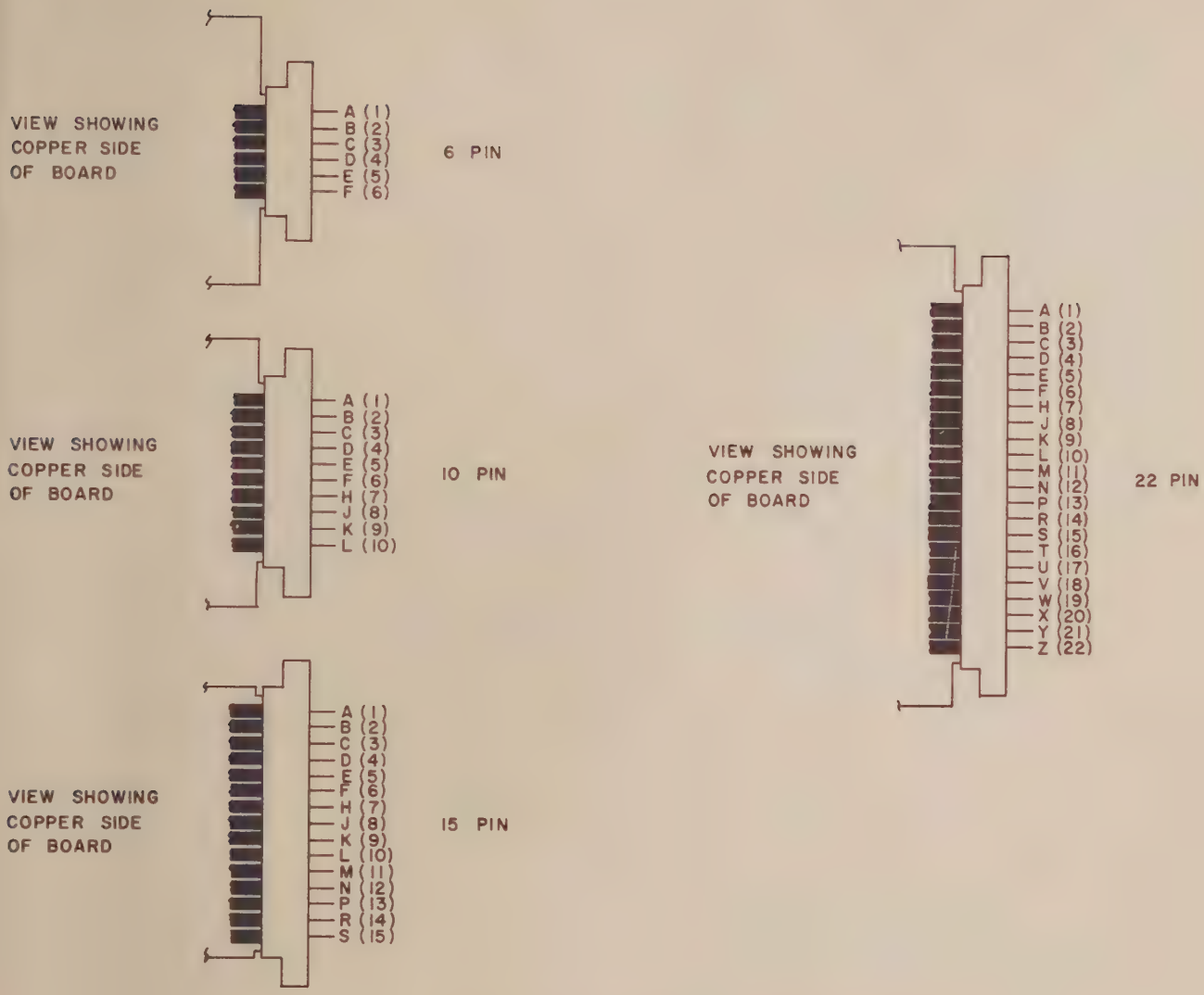
6. NOISE CALIBRATE

a. Place a small shorting jumper between pins 5 and 7 of the extender card socket and close the shield cover. Place the TEST-CAL switch in the CAL position, the IC CIRCUIT GAIN switch in the 0 DB position and adjust the inner concentric knob for center scale CALIBRATE indication.

b. Apply 0.1 VRMS 1 KHz sine wave to the EXT CAL jack, being certain that the phone plug is inserted completely.

c. The front panel CALIBRATE meter should read on the center CALIBRATE line and the voltage at J302, the NOISE OUT jack, should be 1 VRMS ± 5%.

If the above procedure has been followed and the results indicated obtained, the Model 2283 may be considered to be in normal condition with respect to operating functions and calibration.



PRINTED CIRCUIT BOARD CONNECTOR LUG IDENTIFICATION

SCHEMATIC LEGEND

k = 1000

⊘ = Screw Driver Adjustment

▭ = Front Panel Control

* = Factory Select

Unless Otherwise Specified:

All Resistances in Ohms

All Resistors 1/2 Watt

All Capacitances in Microfarads

SEMICONDUCTOR LEGEND

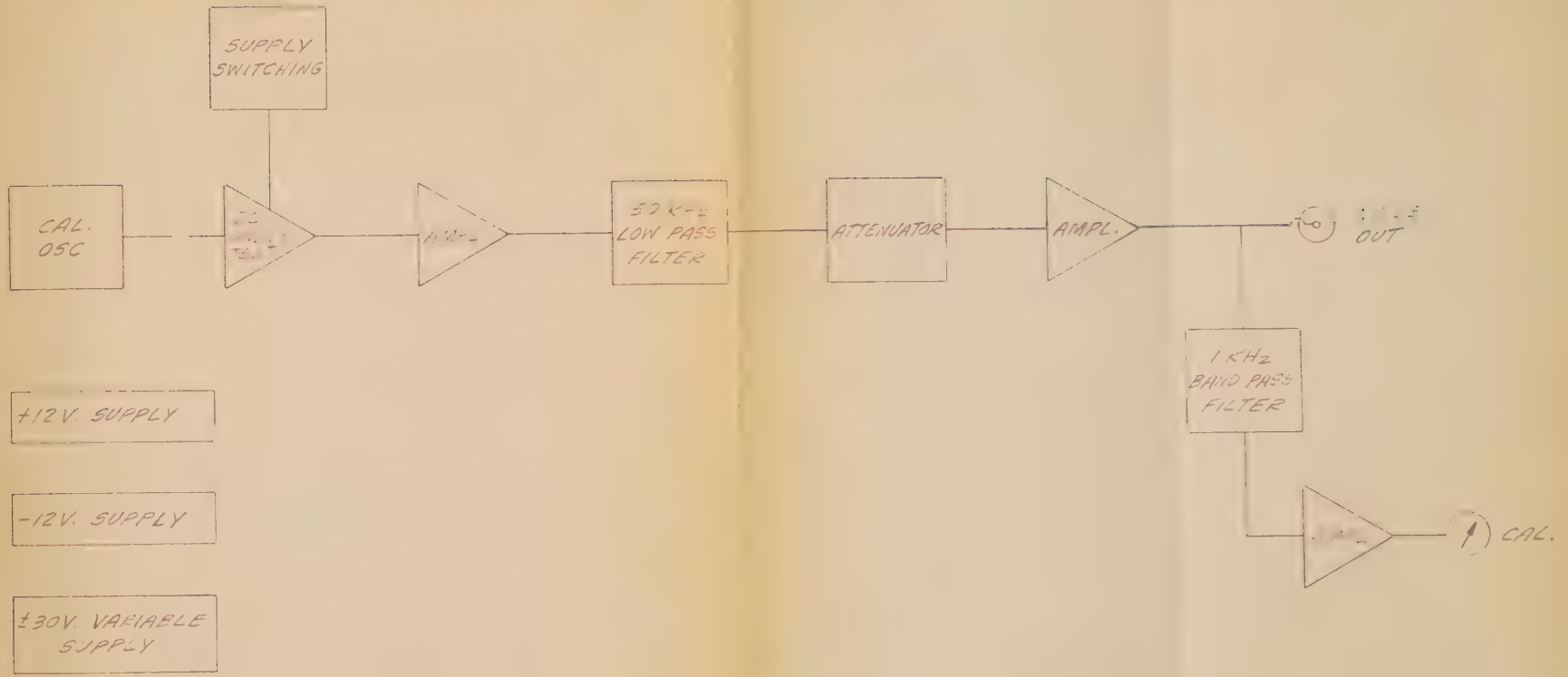
Changes and improvements in the semiconductor products available for commercial use necessitate type changes from time to time. To eliminate confusion and costly paperwork, many of these changes will be covered in the following legend. The purpose of this legend is to acknowledge the fact that the type number on a semiconductor found in a piece of equipment will not necessarily correspond with the type number given on the schematic diagram.

The legend is not intended to be an interchangeability list although in many cases good quality components* within a given category may be substituted with acceptable results. Normally, replacements should be made using components having the same type number as the component being replaced.

Those components bearing an asterisk on the schematic diagram are factory selected components and should be obtained from Quan-Tech Laboratories.

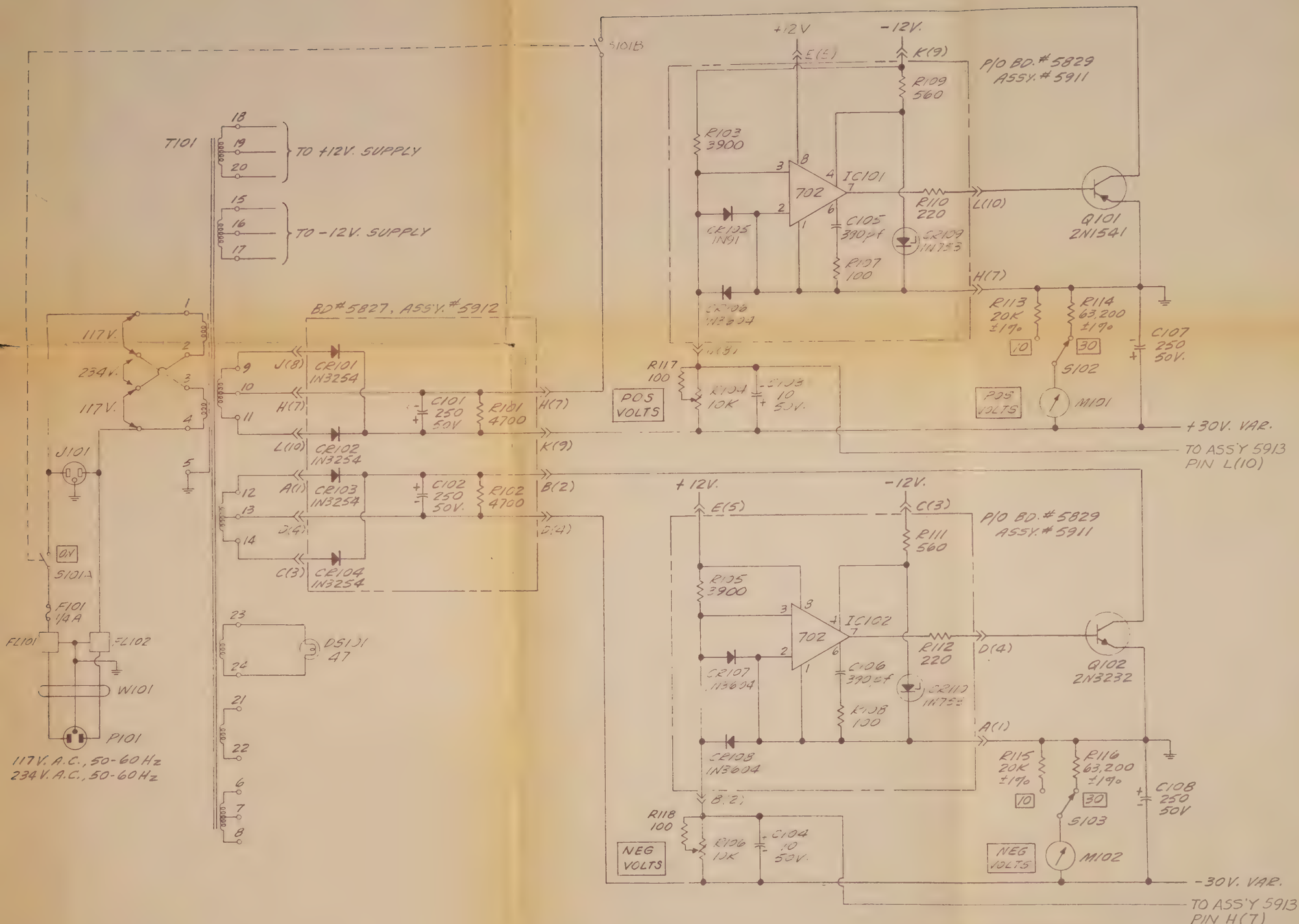
*It should be noted that the incoming inspection procedure followed at Quan-Tech Laboratories includes noise screening on most semiconductors.

TYPE # ON SCHEMATIC	TYPE # IN EQUIPMENT
T1480	2N1613
T1494	2N1613
1N703	1N748
1N709	1N753
1N2859	1N3253, 1N3254
1N2862	1N3254
1N482A	1N3604
2N396A	4JX1G759, 4JX1D653, 2N3644
2N414	2N396A, 4JX1G759, 4JX1D653, 2N3644
2N929	220N2, A642, 2N3566, A322, A324
2N1515	2N3644
2N1613	2N3566
2N2219	220N2, A642, 2N3566, A322, A324
2N2603	2N3250
2N3250	2N3644
2N270	2N3644
2N1306	2N3566
2N1304	2N3566
2N3250	2N3251
UC240	2N4869



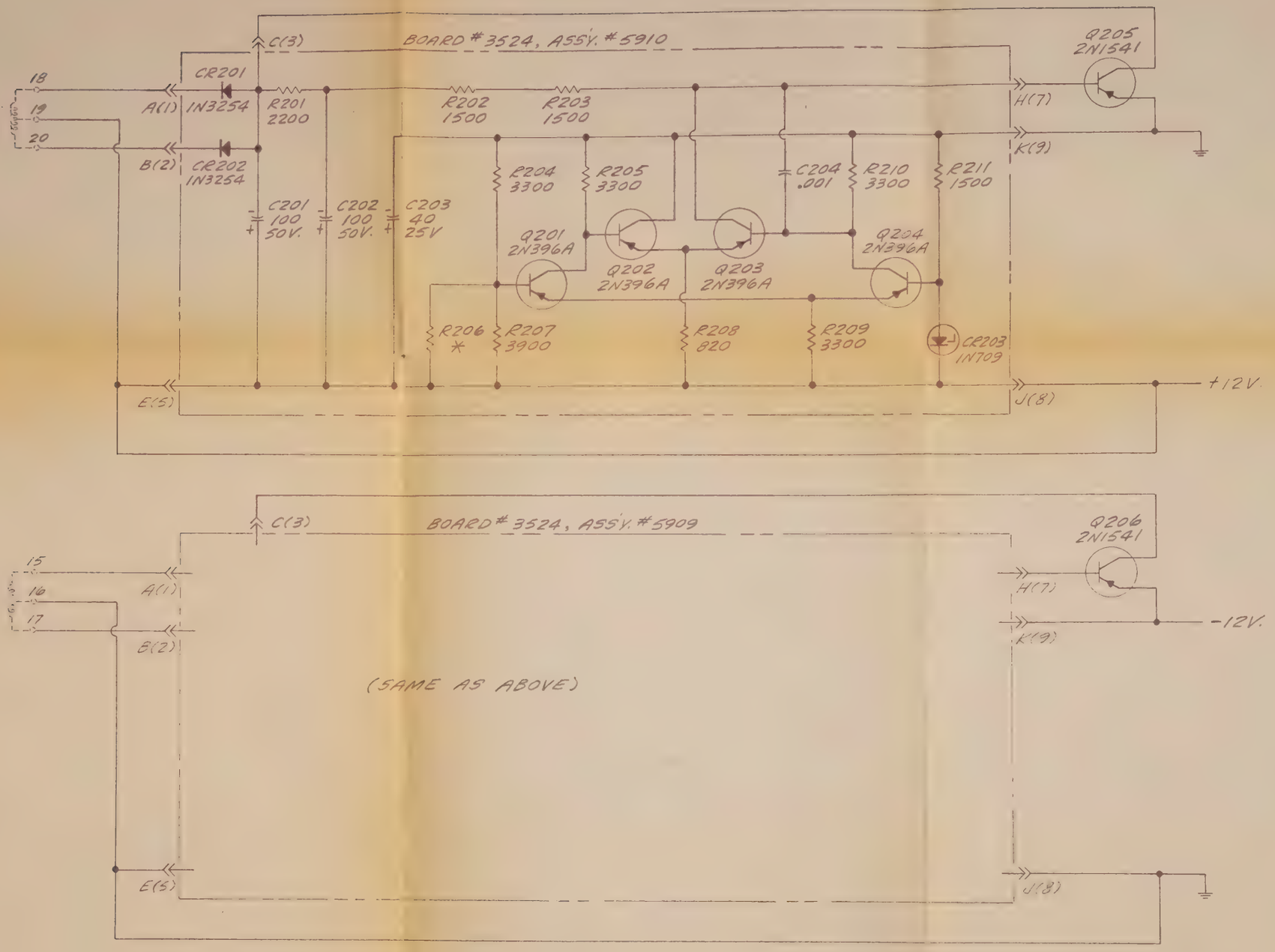
BLOCK DIAGRAM
MODEL 2283

B-5890-A



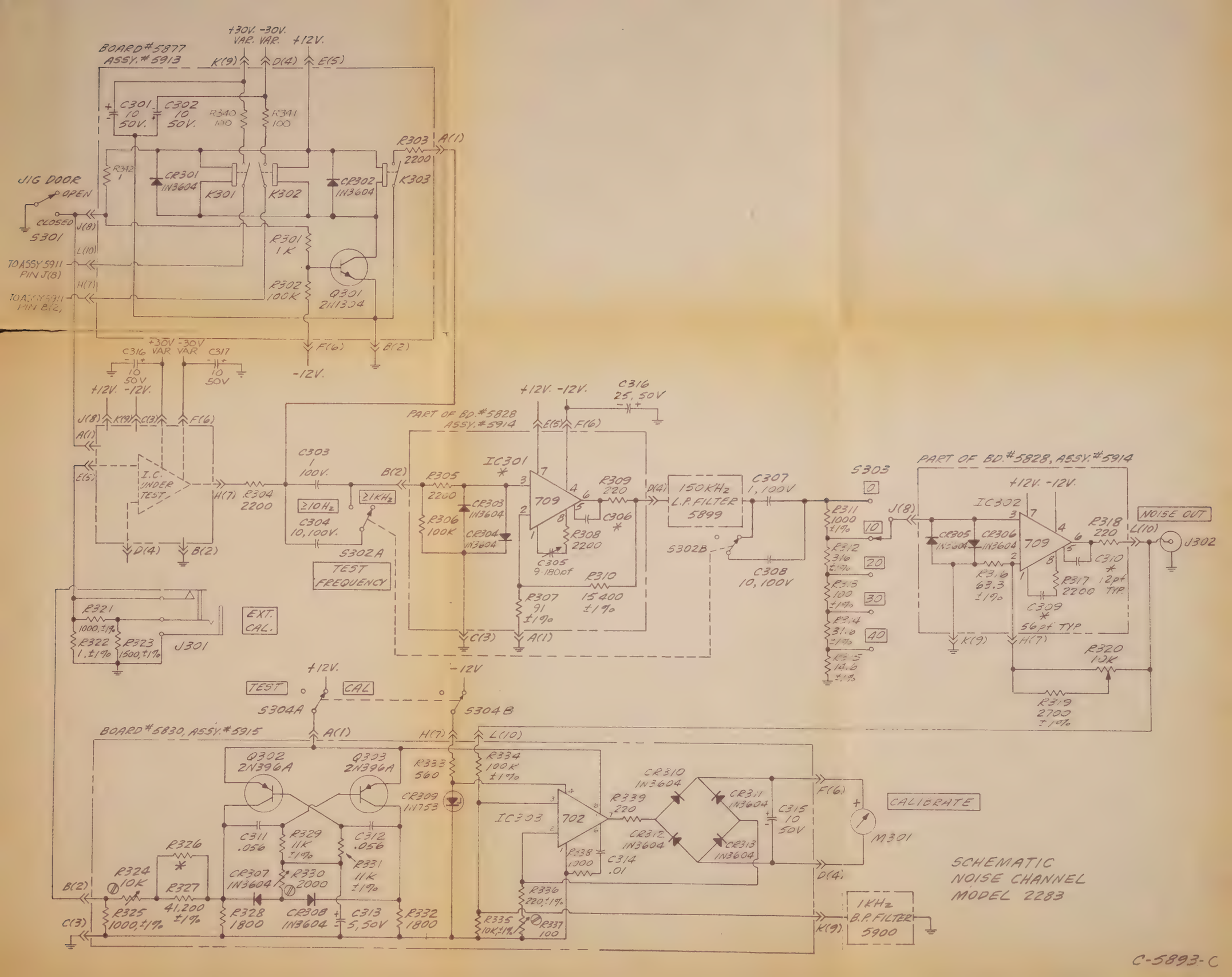
SCHEMATIC
POWER INPUT AND VARIABLE SUPPLIES
MODEL 2283

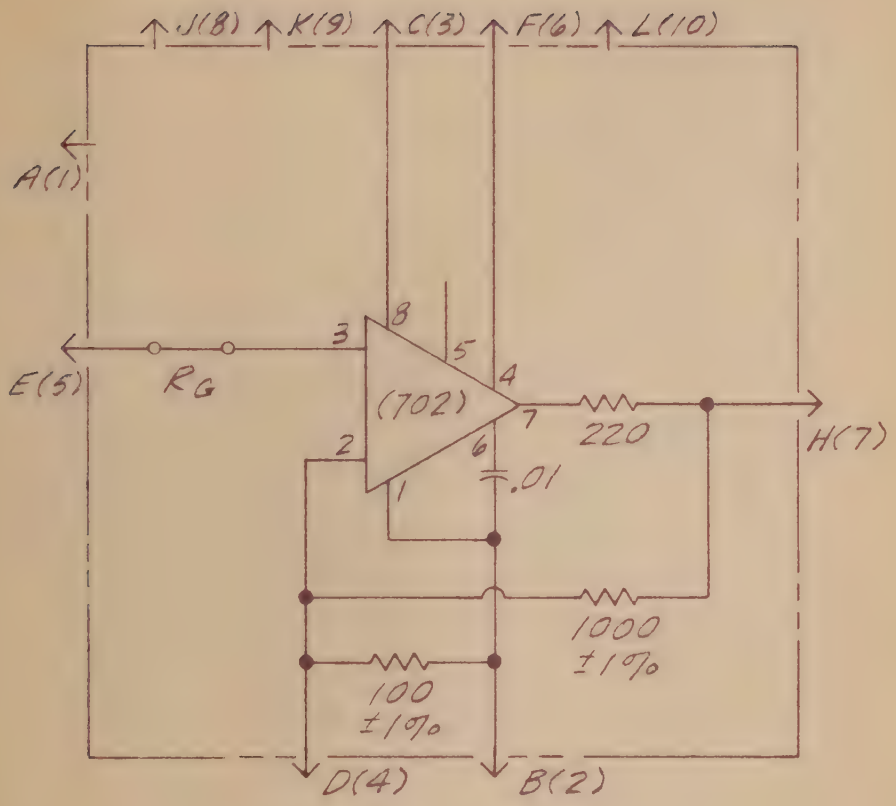
C-5891-D



SCHEMATIC
12V. SUPPLIES
MODEL 2283

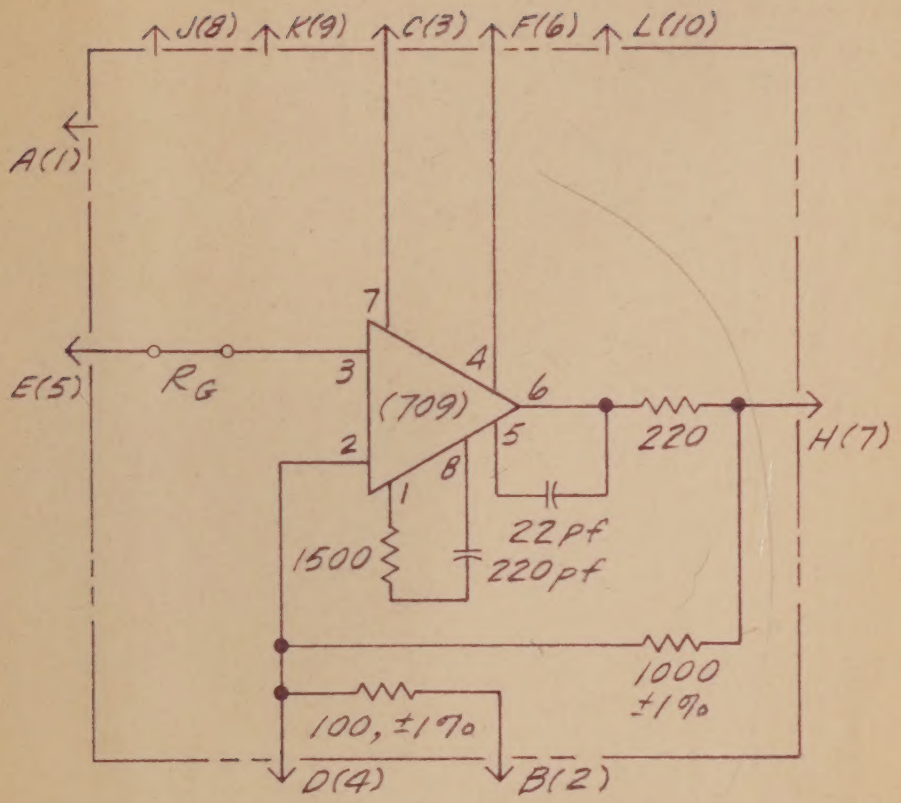
C-5892-B


BOARD #5877
ASSY. #5913
+30V. VAR.
-30V. VAR.
+12V.
K(9)
D(4)
E(5)
C301 10 50V.
C302 10 50V.
R340 100
R341 100
R342 1
CR301 IN3604
CR302 IN3604
K301
K302
K303
R303 2200
A(1)
JIG DOOR
OPEN
CLOSED
S301
J(8)
L(10)
TO ASSY 5911 PIN J(8)
H(7)
TO ASSY 5911 PIN B(2)
R301 1K
R302 100K
Q301 2N1304
F(6)
B(2)
-12V.
C316 10 50V
C317 10 50V
+12V. -12V.
PART OF BD. #5828 ASSY. #5914
C316 25, 50V
C(3)
I.C. UNDER TEST
C303 1 100V.
R304 2200
≥10Hz
≥1KHz
C304 10,100V.
S302A
TEST FREQUENCY
IC301
709
R305 2200
CR303 IN3604
CR304 IN3604
R306 100K
R307 91 ±1%
R308 2200
C305 9-180pf
R309 220
C306 *
R310 15400 ±1%
150KHz L.P. FILTER 5899
C307 1, 100V
S302B
C308 10,100V
S303
0
10
20
30
40
R311 1000 ±1%
R312 316 ±1%
R313 100 ±1%
R314 31.6 ±1%
R315 12.6 ±1%
PART OF BD. #5828, ASSY. #5914
IC302
CR305 IN3604
CR306 IN3604
R316 63.3 ±1%
R317 2200
R318 220
C309 * 56 pf TYP
C310 * 12pf TYP.
NOISE OUT
J302
R320 10K
R319 2700 ±1%
R321 1000, ±1%
R322 1, ±1%
R323 1500, ±1%
J301
EXT. CAL.
TEST
CAL
S304A
S304B
BOARD #5830, ASSY. #5915
Q302 2N396A
Q303 2N396A
R333 560
R334 100K ±1%
CR309 IN753
IC303
702
R339 220
CR310 IN3604
CR311 IN3604
CR312 IN3604
CR313 IN3604
C315 10 50V
C314 .01
R338 1000
M301
CALIBRATE
R336 220, ±1%
R337 100
R335 10K, ±1%
1KHz B.P. FILTER 5900
R324 10K
R326 *
R327 41.200 ±1%
R325 1000, ±1%
C311 .056
R329 111K ±1%
R330 2000
R331 111K ±1%
C312 .056
CR307 IN3604
R328 1800
CR308 IN3604
C313 5, 50V
R332 1800
SCHEMATIC
NOISE CHANNEL
MODEL 2283
C-5893-C



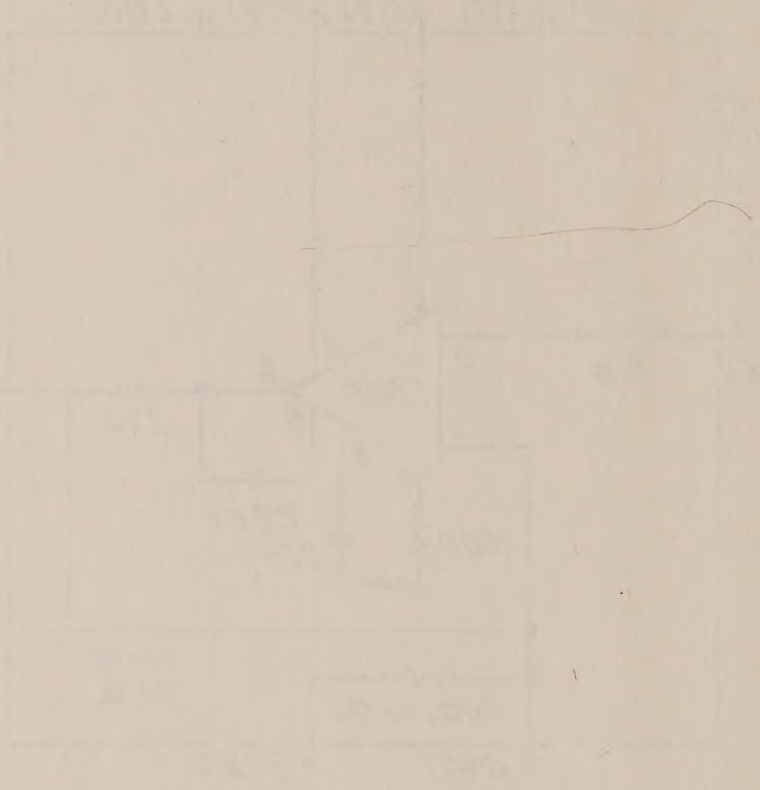
SCHEMATIC
BOARD ASSY., I.C. TEST (702)
BOARD #5848, ASSY. # 5916

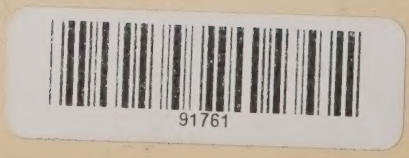
A-5917-A



SCHEMATIC
BOARD ASSY., I. C. TEST (709)
BOARD #5849, ASSY. #5918

A-5919-B




91761